UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/750,806	01/02/2004	William H. Bridge JR.	50277-2358	1803

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EXAMINER
FLEURANTIN, JEAN B

ART UNIT	PAPER NUMBER
2162	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

	Application No.	Applicant(s)
Office Action Summary	10/750,806	BRIDGE ET AL.
	Examiner	**Art Unit**	
	JEAN B. FLEURANTIN	2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>21 March 2007</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-18</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-4, 6-14 and 16-18</u> is/are rejected.

7) ☒ Claim(s) <u>5 and 15</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1.   A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 3/21/07 has been entered.

The following is the status of claims:

Claims 1-18 remain pending for examination.

The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness

rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 6-12 and 15-18 are rejected under 35 U.S.C.103(a) as being unpatentable over

"background, specification page 1, paragraph [0004] to page 9, paragraph [0028]" - (Applicant Admitted Prior

Art) ("APA") in view of U.S., Patent 5,485,608 issued to Lomet et al., ("Lomet").

As per claim 1, APA discloses a method comprising the steps of:

"storing a checkpoint value" (see Fig. 1, item 158) "that indicates which records of a plurality of

records have to be processed after the failure" (i.e., data recoverable is to write redo records into a redo

log file in nonvolatile memory, in which the redo records containing a description of the changes that were

made by a particular transaction, enabling a recovery process to reapply the changes in the event of a

failure; see page 3, paragraph [0010]), "wherein the plurality of records indicate changes for a plurality of

data blocks" (i.e., data items or data blocks; see page 4, paragraph [0013] and Fig. 1, item 128); and

"writing changes from volatile memory to nonvolatile memory to advance the checkpoint value"

(i.e., checkpoint process then marks as needing checkpointing all buffers in buffer cache that contain

changes since being loaded from database; see page 7, paragraph [0023] and Fig. 1).

APA fails to explicitly disclose <u>reducing</u> the <u>recovery time</u> after a failure; and based on a user-

specified value that corresponds to how much work will be required during a redo phase of recovery.

However, Lomet discloses <u>reducing</u> the <u>recovery time</u> after a failure (see Lomet col. 13, lines 59-61); and

based on a user-specified value that corresponds to how much work will be required during a redo phase

of recovery (see Lomet col. 20, lines 32-44 and col. 21, lines 12-20 and Fig. 9). It would have been

obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of APA by reducing the recovery time after a failure; and based on a user-specified value that corresponds to how much work will be required during a redo phase of recovery as disclosed by Lomet (see Lomet col. 22, lines 31-36). Such a modification would allow the method of APA to provide efficient recovery using techniques of state identifiers which promote easy system crash recovery as well as media failure recovery (see Lomet col. 2, lines 46-50), therefore, improving, the accuracy and the reliability of the method and system for controlling recovery downtime.

As per claim 2, APA further discloses "maintaining, in volatile memory, one or more sorted buffer queues" (i.e., buffer cache (102) containing one or more sorted buffers queues (104, 106, 108 and 110); page 4, paragraph [0013]), "wherein each sorted buffer queue includes queue entries that are inserted into said sorted buffer queue based on an index value associated with said queue entry" (i.e., buffers queues (104, 106, 108 and 110) containing data loading into (inserting into) volatile memory from data items (142, 134, 130 and 138), which are respectively data blocks (A), (B), (C) and (D) (index value); see page 4, paragraph [0013]), "wherein each queue entry reflects a change to a data block of the plurality of data blocks" (i.e., data items (142, 134, 130 and 138) in the database reflecting changes that have been recorded; see page 4, paragraphs [0014 and 1015]).

As per claim 3, APA further discloses "wherein the one or more sorted buffer queues are one or more circular sorted buffer queues" (i.e., buffer cache (102) containing one or more sorted buffers queues (104, 106, 108 and 110); page 4, paragraph [0013]), and "wherein a modulus operation is used to identify the index value associated with each circular sorted buffer queue entry when inserting a queue entry into the circular sorted buffer queue" (i.e., buffers queues (104, 106, 108 and 110) containing data loading into (inserting into) volatile memory from data items (142, 134, 130 and 138), which are respectively data blocks (A), (B), (C) and (D) (index value); see page 4, paragraph [0013]).

As per claim 6, APA discloses "updating the checkpoint value comprises: updating the checkpoint value to equal a byte offset in a redo log associated with the queue entry in the one or more sorted buffer queues that is associated with the least recently modified buffer in any queue entry in the one or more sorted buffer queues" (i.e., byte offset from the binning of the log file, where all redo records that stored in the log file before the location identified by the checkpoint value are guaranteed to be reflected in the database; see page 7, paragraph [0022]).

As per claim 7, in addition to claim 10, APA further discloses "maintaining, in volatile memory, one or more sorted buffer queues" (i.e., buffer cache (102) containing one or more sorted buffers queues (104, 106, 108 and 110); page 4, paragraph [0013]), "wherein each partially sorted buffer queue includes queue entries that are inserted into said partially sorted buffer queue based on an index value associated with said queue entry" (i.e., buffers queues (104, 106, 108 and 110) containing data loading into (inserting into) volatile memory from data items (142, 134, 130 and 138), which are respectively data blocks (A), (B), (C) and (D) (index value); see page 4, paragraph [0013]), "wherein each queue entry reflects a change to a data block of the plurality of data blocks" (i.e., data items (142, 134, 130 and 138) in the database reflecting changes that have been recorded; see page 4, paragraphs [0014 and 1015]).

As per claim 8, in addition to claim 1, APA discloses "a byte offset to an identified redo log file" (i.e., byte offset which representing (identifying) redo record; see page 7, paragraph [0023]).

As per claim 9, in addition to claim 1, APA fails to explicitly wherein the required recovery time indicates a maximum length of time that is to be allowed for recovering after said database system failure. However, Lomet discloses wherein the required recovery time indicates a maximum length of time that is to be allowed for recovering after said database system failure (see Lomet col. 13, lines 59-61). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the teachings of APA by APA further discloses wherein the required recovery time indicates a maximum

length of time that is to be allowed for recovering after said database system failure as disclosed by Lomet (see Lomet col. 14, lines 62-67). Such a modification would allow the method of APA to provide efficient recovery using techniques of state identifiers which promote easy system crash recovery as well as media failure recovery (see Lomet col. 2, lines 46-50), therefore, improving, the accuracy and the reliability of the method and system for controlling recovery downtime.

As per claim 10, in addition to claim 1, APA further discloses "a computer-readable storage medium carrying one or more sequences of instructions, wherein execution of the one or more sequences of instructions by one or more processors causes the one or more processors causes" (i.e., one or more processes (sequences instructions) executing on a database server; see page 2, paragraph [0007]) to perform the steps of "maintaining a checkpoint value that indicates which records of a plurality of records have to be processed after the failure, wherein the plurality of records indicate changes for a plurality of data blocks" (i.e., data recoverable is to write redo records into a redo log file in nonvolatile memory, since the redo records containing a description of the changes that were made by a particular transaction; see page 3, paragraph [0010]).

As per claim 11, in addition to claim 2, APA further discloses "execution of the one or more sequences of instructions by one or more processors causes the one or more processors to further perform" (i.e., processes executing on a database server; see paragraph [0007]).

As per claim 12, the limitations of claim 12 are similar to claim 3, therefore, the limitations of claim 12 are rejected in the analysis of claim 3, this claim is rejected on that basis.

As per claim 15, APA discloses "updating the checkpoint value comprises: updating the checkpoint value to equal a byte offset in a redo log associated with the queue entry in the one or more sorted buffer queues that is associated with the least recently modified buffer in any queue entry in the one or more sorted buffer queues" (i.e., byte offset from the binning of the log file, where all redo records that stored in the log file before the location identified by the checkpoint value are guaranteed to be reflected in the database; see page 7, paragraph [0022]).

As per claim 16, in addition to claim 7, APA further discloses "execution of the one or more sequences of instructions by one or more processors causes the one or more processors to further perform" (i.e., processes executing on a database server; see paragraph [0007]).

As per claim 17, the limitations of claim 17 are similar to claim 8, therefore, the limitations of claim 17 are rejected in the analysis of claim 8, this claim is rejected on that basis.

As per claim 18, in addition to claim 9, APA further discloses "a computer-readable storage medium carrying one or more sequences of instructions, wherein execution of the one or more sequences of instructions by one or more processors causes the one or more processors causes" (i.e., one or more processes (sequences instructions) executing on a database server; see page 2, paragraph [0007]) to perform the steps of "maintaining a checkpoint value that indicates which records of a plurality of records have to be processed after the failure, wherein the plurality of records indicate changes for a plurality of data blocks" (i.e., data recoverable is to write redo records into a redo log file in nonvolatile memory, since the redo records containing a description of the changes that were made by a particular transaction; see page 3, paragraph [0010]).

Claims 4 and 13 are rejected under 35 U.S.C.103(a) as being unpatentable over applicant'

background, specification page 1, paragraph [0004] to page 9, paragraph [0028], (Applicant Admitted Prior Art)

("APA") in view of U.S., Patent 5,485,608 issued to Lomet et al., ("Lomet") as applied to claims 1-3, 6-12

and 15-18 above, and further in view of "ARIES-RRH: restricted repeating of history in the ARIES

transaction recovery method" issued to Mohan et al., ("Mohan").

As per claims 4 and 13, in addition to claim 1, "execution of the one or more sequences of

instructions by one or more processors causes the one or more processors to further perform" (i.e.,

processes executing on a database server; see paragraph [0007]). APA fails to explicitly disclose

maintaining a count of the queue entries in each of the one or more sorted buffer. However, Mohan

discloses a method for maintaining a count of the queue entries in each of the one or more sorted buffer

(see Mohan page 719, col. 1, paragraph (2), lines 9-16). It would have been obvious to a person of

ordinary skill in the art at the time the invention was made to modify the method of APA by maintaining a

count of the queue entries in each of the one or more sorted buffer as disclosed by Mohan (see Mohan

page 719, col. 2, last paragraph). Such a modification would allow the method of APA to provide reducing

the number of I/Os to database pages during the redo pass by avoiding reading into the buffer pool those

pages, in the dirty data list, for which log records written by only loser transactions are encountered (see

Mohan page 721, col. 2, last paragraph), therefore, improving the accuracy of the method and system for

controlling recovery downtime.

Claim Objections / Allowable Subject Matter

Claims 5 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Applicant' Remarks

Applicant's arguments with respect to claims 1-18 have been fully considered but, have been found persuasive only to the extent the prior art of record does not specifically disclose the limitations " ... based on a user-specified value that corresponds to how much work will be required during a redo phase of recovery." And "...based on the maximum number of data block reads that can be performed in the required recovery time." However, the combination of APA and Lomet discloses such limitations.

Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Demers et al., U.S. Patent No. 5,870,760 relates propagating changes from one site to another.

CONTACT INFORMATION

2.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to JEAN B. FLEURANTIN whose telephone number is 571 – 272-4035. The examiner can normally be reached on 7:05 to 4:35.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN E BREENE can be reached on 571 – 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jean Bolte Fleurantin

Patent Examiner

Technology Center 2100

March 29, 2007